MDOT's UAS Success Stories

Future of UAV's in MDOT

MDOT has started an internal taskforce to provide leadership with recommendations on how to utilize, govern and manage Unmanned Aircraft Systems/services and associated data to maintain a safe, transformative and innovative transportation system. The primary use cases include:
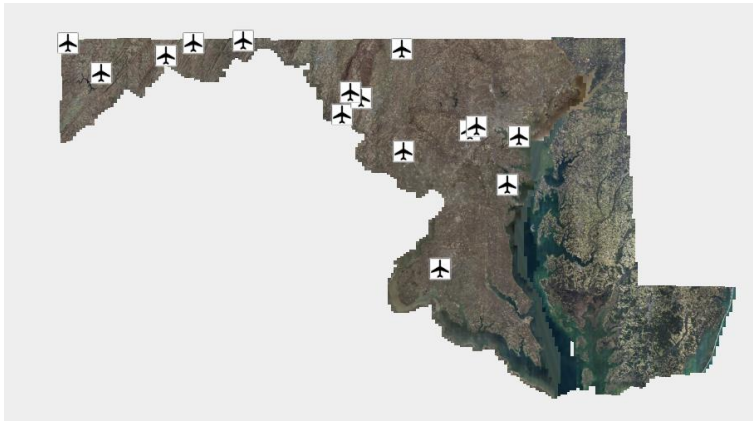
- Geologic analysis

- Environmental analysis
    - Monitoring invasive species
    - Hydrology

- Inspections
    - Bridges
    - Towers
    - Solar Panels

- Accident reconstruction

- Construction data collection (pre-construction assessment, as-built surveys, cut/fill volumetric calculations)

- Surveying

Future of UAV's in MDOT

- Core areas the team is focusing on include:

  - Organization-wide UAS Policy

  - Procurement
    - Standard contract language for construction contracts
    - Potential contract vehicles

  - Data Management
    - Data request process
    - Tool/data format standardization

  - Creating standard operating procedures for flight activities
    - Flight requests
    - Preflight checklists
    - Flight Safety Plan
    - Postflight summary report

Engineering Geology Division's 2018 UAV Deliverables

- Monitored 27 sites with multiple flights per site

- Completed 60+ flights

- Responded to 4 emergencies and provided deliverables same day (estimated volume loss/change, 3d models, etc.)

- Captured and processed 9,319 images

Current completed flight locations

Haystack Mt. Landslide

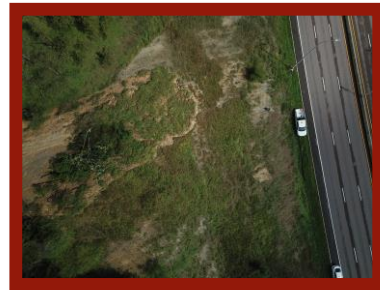
Ellicott City flood

MD 180 Bridge Overtopping

US 40 alt slope failure

MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

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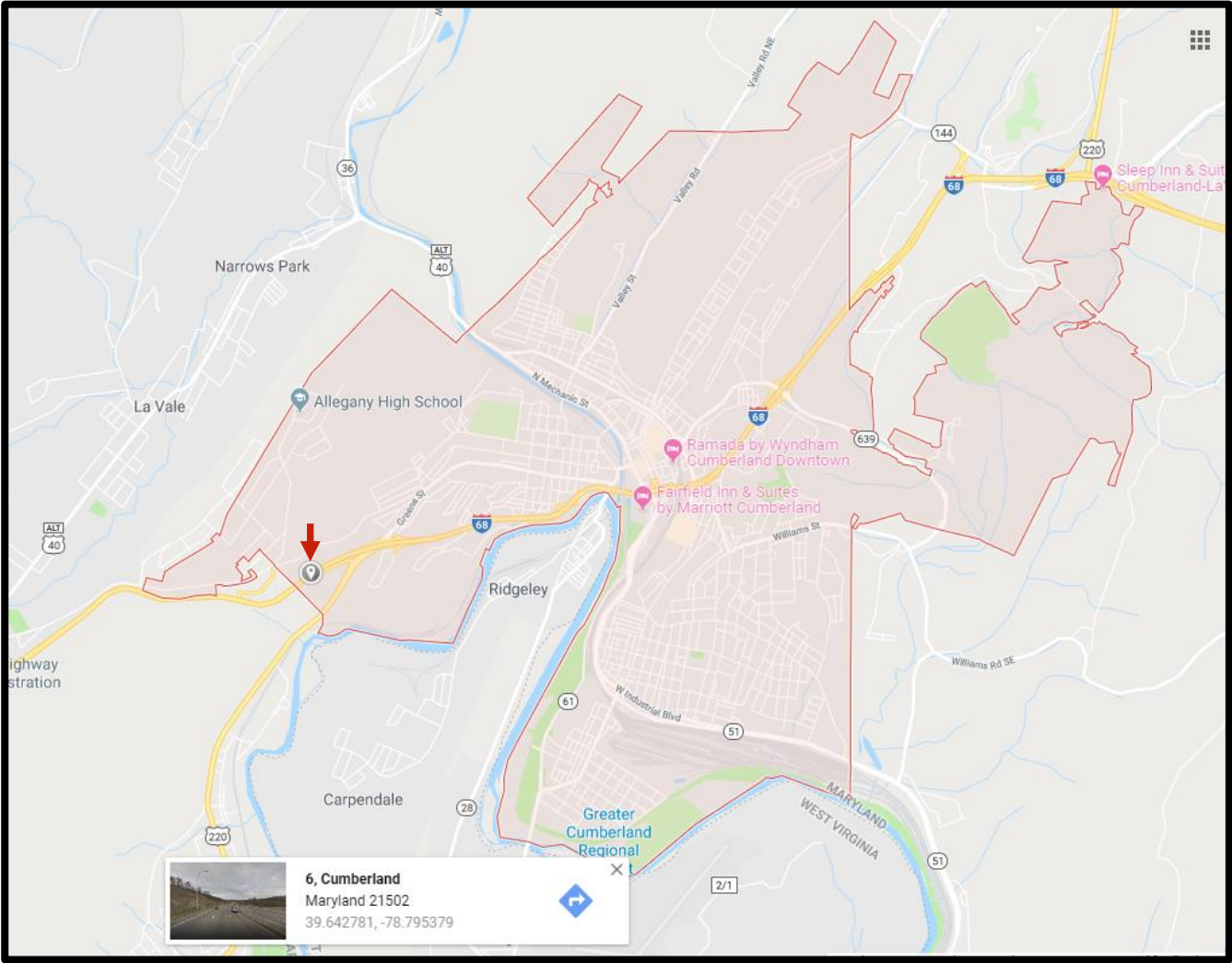
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MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

Emergency call out regarding landslide along I-68 west of Cumberland on September 26 2018.

While at the site we flew the slope with UAS in order to run a stability analysis. During the flight we observed cracking within the slope that was not initially visible by foot.

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From the photogrammetry model that was processed the same day, we were able to model the slope stability to better understand the factor of safety and overall stability of the slope.
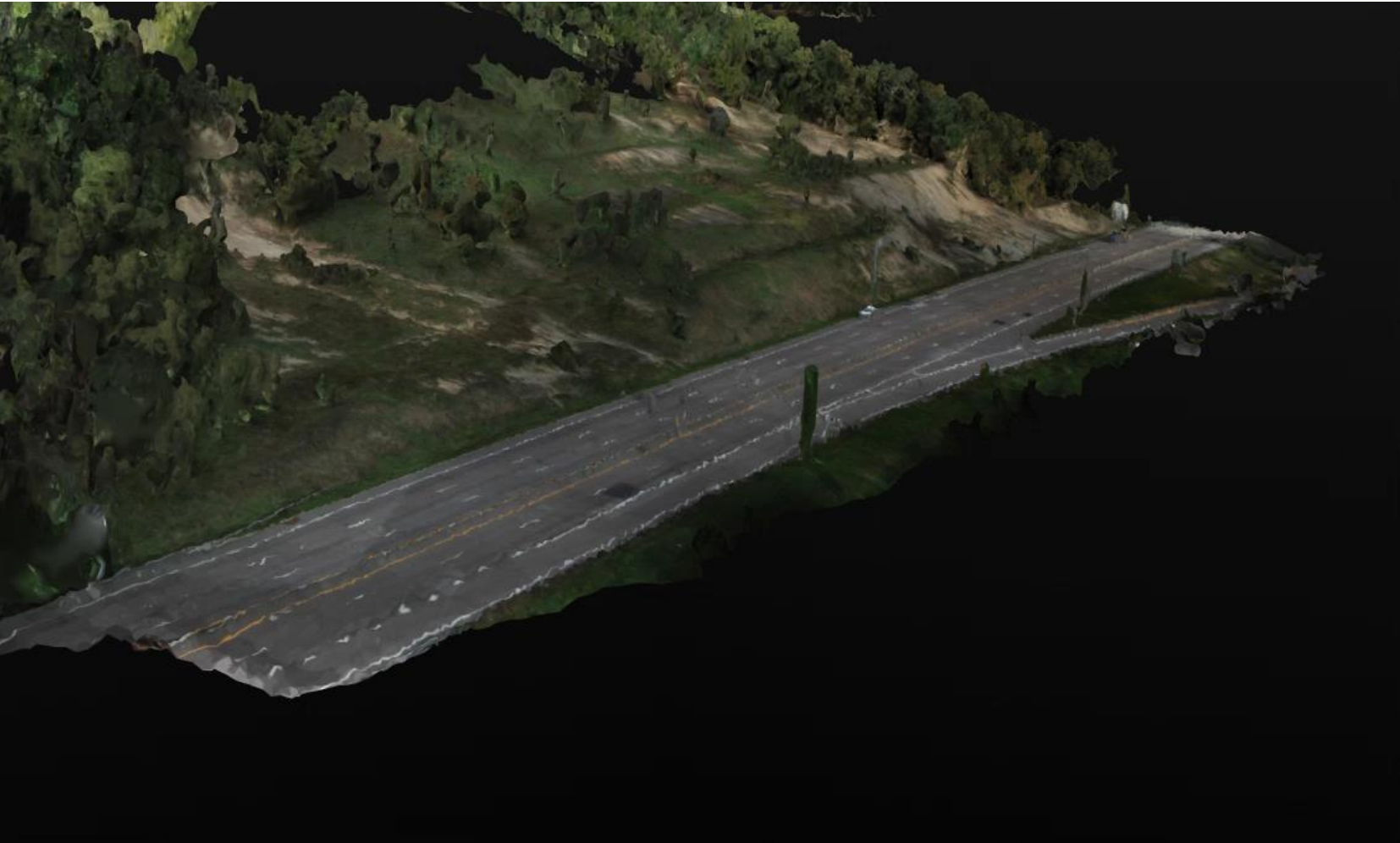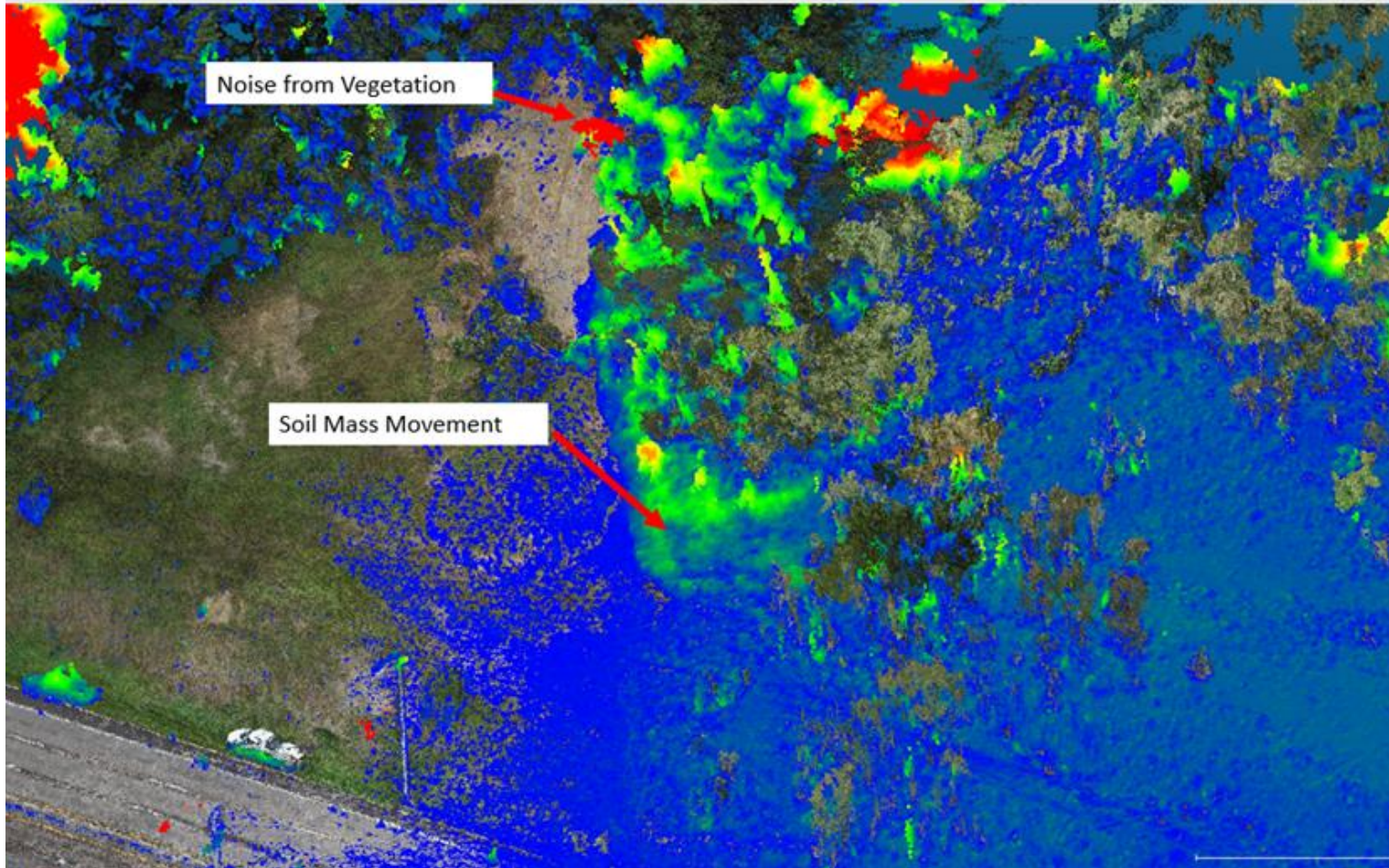

pix4d
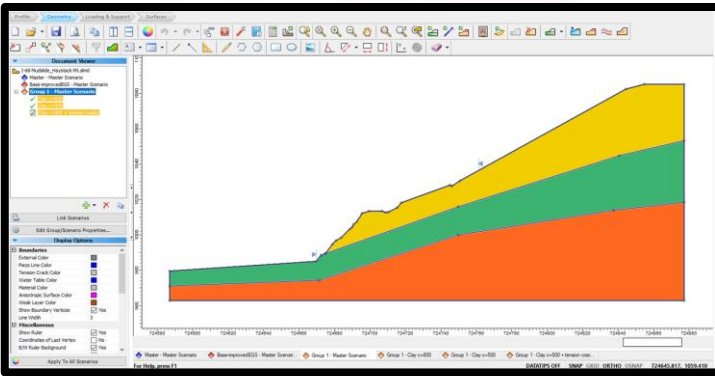
Slope Stability Software (Slide)

Given the observed condition and stability analysis. We flew this location again on October 10 and October 12 to quantify the changes between a major rain event. We were able to do a comparative analysis between the two point clouds in order to show the soil mass movement that occurred.

Cloud Compare

As further documentation we installed time lapse cameras along the cracks to observe the rain fall and soil movement.

TLC200 2018/10/10 17:14:08

On 10/18/18 approx. 2,000 cubic yards of soil were removed from the slope as an emergency mitigation effort. This was to prevent failed slope soils from sliding into I-68.

This site is still moving, and being monitored.

Lessons Learned

- Utilize a centralized UAV data storage location that is GIS and web based.

  We have developed an ArcGIS online web app that provides all of the UAV captured data to all MDOT users. From this online based tool users can view basemaps, images, and process elevation profiles and volumes.

  For this tool we also created the following UAV network location that is Read Only for all MDOT users and Read Write for only UAV users

- For this webapp to stay updated we created a Survey123 app UAV Flight record tool.

  We recommend it be required that this tool is filled out before any UAV is flown in a new location. The Survey123 tool works on cellphones, tablets, and laptops.

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Questions

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